

HOW TO SELECT A TYPICAL SECTION

1-2

For assistance in selecting a typical section, a brief explanation is provided for the major considerations that are directly or indirectly affected by the design criteria. Study each of these carefully before you begin to select a typical section.

The typical section should be based on sound engineering principles with primary emphasis being placed on the type of facility, traffic volumes, terrain, availability of right of way, grading, guardrail construction and economics.

On projects of major importance and where a significant savings can be realized, several design combinations should be considered. After the most feasible of the design combinations are chosen, an analysis should be made to select a typical section that will provide a safe and economical highway. An analysis in the early stages of design may determine that it is necessary to revise the typical section to:

- 1) Reduce right of way takings.
- 2) Improve grading operations.
- 3) Utilize waste material to flatten slopes which will provide greater roadside clearances and may sometimes eliminate the need for guardrail.
- 4) Reduce wetland taking in environmentally sensitive areas.

CRITERIA FOR ROADWAY TYPICAL SECTION AND SLOPES

1-2A

STANDARD METHOD OF CONSTRUCTING CUT AND FILL SLOPES

(A) Interstates, Freeways, Expressways and other four-lane facilities

See 1-2A, F-1 (A).

(B) Arterials (other than Expressways and four-lane facilities), Collectors, and Locals (over 4000 ADT Design Year Traffic)

See 1-2A, F-1 (B).

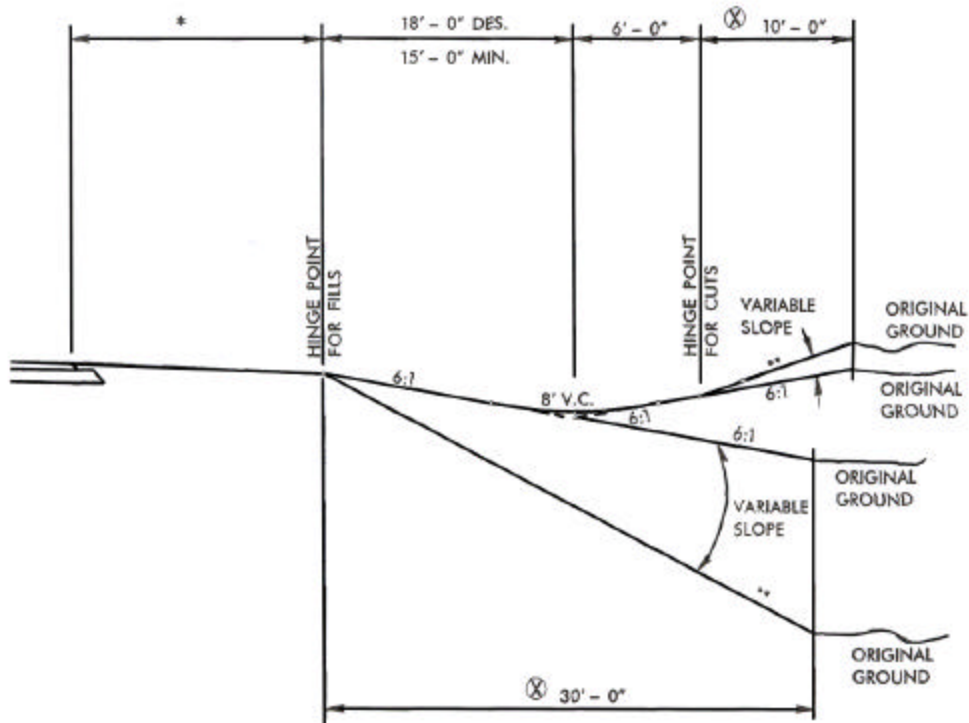
(C) Collectors and Locals (4000 ADT or less Design Year Traffic)

See 1-2A, F-1(C).

NOTE: These guidelines (A, B and C) apply to new construction, not 3-R Projects or subdivision roads.

FIGURE 11 - 2A
F - 1

(A) INTERSTATES, FREEWAYS, EXPRESSWAYS & OTHER FOUR LANE FACILITIES
(ROUND BOTTOM DITCH WITH HINGE POINT SLOPES)



* FOR SHOULDER WIDTHS, SEE ROADWAY DESIGN MANUAL, PART I, CHAPTER 1-4B, F-1.

⊗ WHEN SLOPE-STAKE POINT FALLS OUTSIDE THE HINGE POINT DISTANCE, MAINTAIN APPROPRIATE MAXIMUM OR MINIMUM SLOPE.

** INTERSTATE SIDE SLOPES SHOULD NOT BE STEEPER THAN 2:1 EXCEPT IN ROCK EXCAVATION OR WHERE THERE ARE OTHER SPECIAL CONDITIONS.

ON FREEWAYS AND EXPRESSWAYS, THE STEEPEST PRACTICAL SLOPES AS DETERMINED BY THE SOILS AND FOUNDATION SECTION SHOULD BE UTILIZED. NORMALLY THESE SLOPES WILL RANGE FROM 1 1/2:1 TO 2:1.

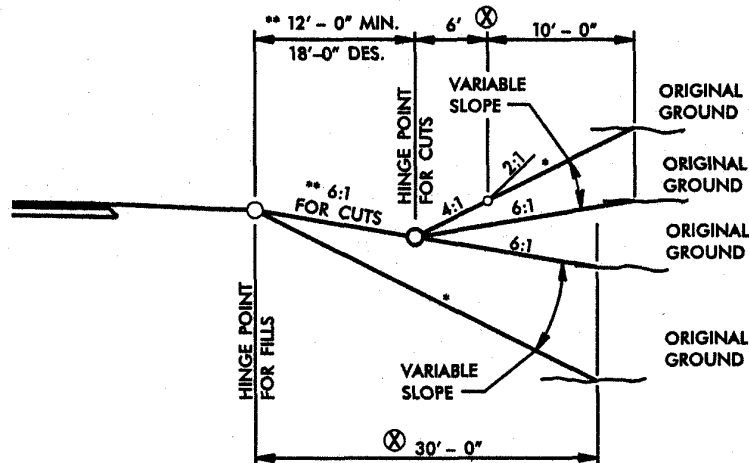
NOTE:

THESE GUIDELINES ARE TO BE USED ALONG WITH SOUND ENGINEERING JUDGEMENT. SPECIAL CONDITIONS SUCH AS SOIL TYPE OR THE NEED FOR ADDITIONAL FILL MATERIAL MAY WARRANT THE USE OF FLATTER OR STEEPER SLOPES THAN THOSE SHOWN IN THESE RECOMMENDATIONS.

(B) ARTERIALS (OTHER THAN EXPRESSWAYS AND FOUR LANE FACILITIES), COLLECTORS, AND LOCALS (OVER 4000 ADT DESIGN YEAR TRAFFIC)

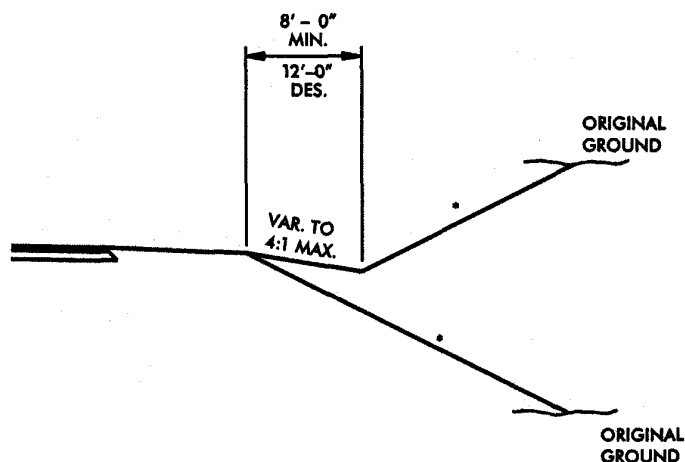
1-2A

F-1



- ⊗ WHEN THESE DISTANCES INDICATE SLOPES OUTSIDE THE LIMITS 6:1 TO *, THE DISTANCE BECOMES VARIABLE AND THE MAXIMUM OR MINIMUM SLOPE MAINTAINED.

(C) COLLECTORS AND LOCALS (4000 ADT OR LESS DESIGN YEAR TRAFFIC)



NOTES: (B AND C)

- ** MAY VARY TO SUIT DRAINAGE REQUIREMENTS. TWO-FOOT MINIMUM DITCH DEPTH IS REQUIRED TO COVER DRIVEWAY PIPE.
- * THE STEEPEST PRACTICAL SLOPES AS DETERMINED BY THE SOILS AND FOUNDATION SECTION SHOULD BE UTILIZED. NORMALLY THESE SLOPES WILL RANGE FROM 1 1/2:1 TO 2:1. A GUARDRAIL STUDY WILL BE REQUIRED FOR FILL SLOPES STEEPER THAN 3:1.

POSITIVE PAVEMENT DRAINAGE
RECOMMENDED FINAL TYPICAL SECTIONS

1-2B

1) 10' TO 22' MEDIANS

Use of the 10' minimum median width is limited to four-lane freeways that have significant right-of-way, terrain or environmental constraints that prohibit the use of the standard 22' or wider median. Future traffic volumes should indicate that additional travel lanes would not be needed within the foreseeable future. A median of this width will be paved with a median barrier. The Pavement Management Unit will develop positive pavement drainage if necessary.

Use of the 22' width median with barrier on new location or widening projects is limited to those projects that have significant right-of-way, terrain or environmental constraints that prohibit or restrict the use of the 46' or wider median. This width median has a barrier and is paved with positive pavement drainage developed by the Pavement Management Unit if necessary.

2) 30' TO 36' MEDIANS

Use of this median width when widening an existing two-lane, two-way facility to four lanes with restricted right-of-way. Use this width only in cases where a 46' minimum width cannot be provided. The mainline pavement will normally have 6' median shoulders and a 5:1 median ditch slope. Positive Drainage Treatment, developed by the Pavement Management Unit and/or the Hydraulics Unit, will be necessary to adequately drain the subgrade since the recommended minimum of 18" below subgrade cannot be achieved with these median widths. The outside shoulder widths will be in accordance with Table 1-4B (Figure 1). The outside shoulder in fills and cuts will be constructed as shown on 1-2B (Figure 1).

3) 46' MEDIAN

This is the minimum median width used for freeways without a median barrier and also the minimum width to be used on new location, non-freeway divided facilities. The 46' minimum width is used when significant right-of-way, terrain or environmental restraints prohibit or restrict the use of the standard 70' freeway median or the standard 60' non-freeway new location.

This median width is also the standard median width to be used when widening existing two-lane roadways to four-lane divided facilities. This median should be used only when significant right-of-way, terrain or environmental restraints prohibit the use of the desirable 60' median width.

POSITIVE PAVEMENT DRAINAGE

RECOMMENDED FINAL TYPICAL SECTIONS (continued)

1-2B

The median should have 6' shoulders and a 6:1 median ditch slope. The outside widths will be in accordance with Table 1-4B (Figure 1). The outside shoulder in fills and cuts will be constructed as shown on 1-2B (Figure 2A or 2B).

4) 60' MEDIANS

Use this median for new location, non-freeway projects when significant right-of-way, terrain or environmental restraints are not present. This median width should also be used when widening existing two lane roadways to four-lane divided facilities and no design or environmental constraints exist to restrict widening beyond the standard 46' median. Future traffic projections should indicate that additional travel lanes would not be required in the foreseeable future. The median would have 12' shoulders and an 8:1 median ditch slope. The outside shoulder widths will be in accordance with Table 1-4B (Figure 1). The outside shoulder in fills and cuts will be constructed as shown 1-2B (Figure 3).

5) 70' MEDIANS

This is the standard median width for freeways. Use this median for all freeway facilities where traffic projections of future volumes indicate the need for two or more additional lanes within the foreseeable future or for four-lane freeways where significant right-of-way, terrain or environmental restraints are not present. The median should have 12' shoulders and an 8:1 median ditch slope. The outside shoulder width will be in accordance with Table 1-4B (Figure 1). The outside shoulder in fills and cuts will be constructed as shown 1-2B (Figure 4).

GENERAL COMMENTS TO BE INCLUDED WITH ATTACHED TYPICAL SECTIONS:

- a) The minimum median width is 46' for all divided facilities without a median barrier and should be the minimum provided when possible. The 10' to 22' median with a barrier is intended for use only where rugged terrain, restricted right-of-way or significant environmental constraints prohibit the use of the 46' or wider median. The 30' – 36' median is intended for use only when widening existing two-lane, two-way facilities to four lanes with very restricted right-of-way. The 60' median should be used on non-freeway facilities when there is no likelihood of needing future median lanes. The 70' median is to be used for freeway facilities that will require additional median lanes in the foreseeable future or where significant environmental, right-of-way, and terrain restraints are not present.

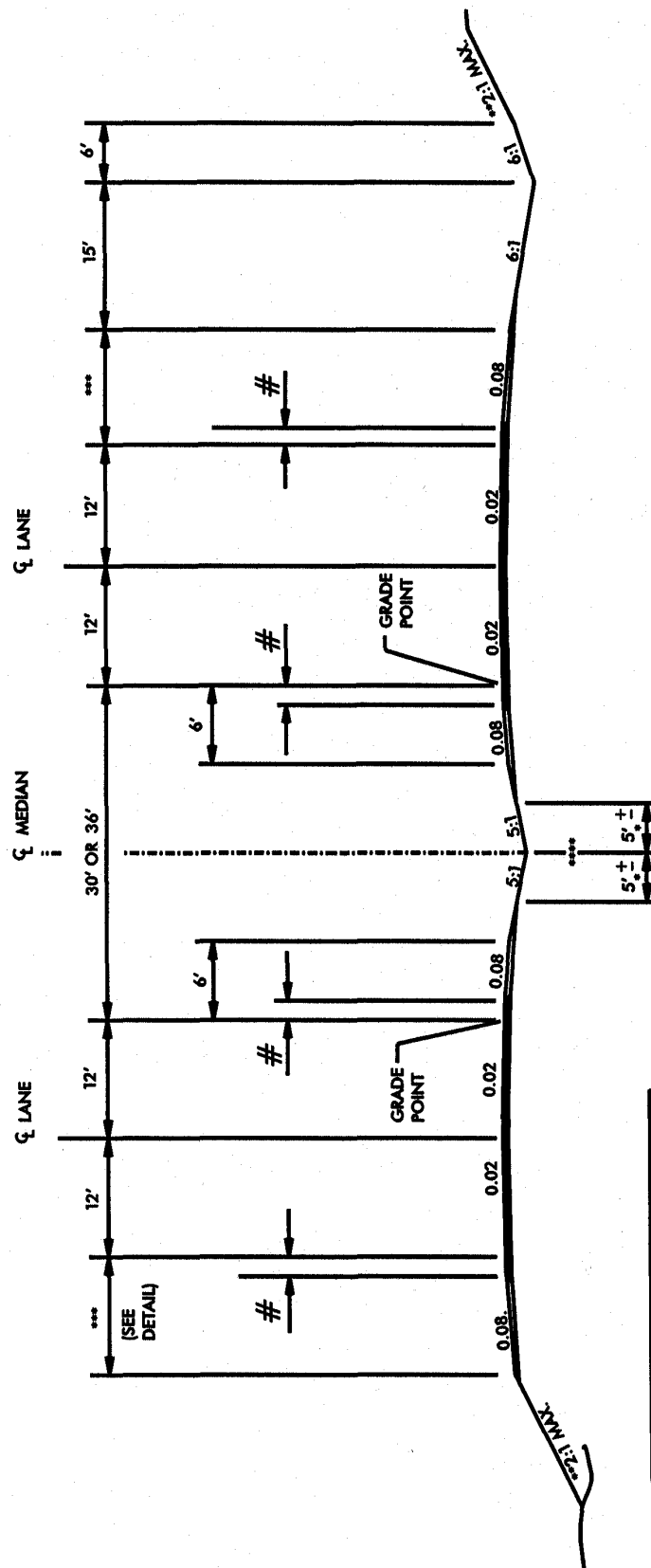
PAVEMENT DRAINAGE

RECOMMENDED FINAL TYPICAL SECTIONS (continued)

1-2B

- b) Refer to the paved shoulder policy for paved shoulder widths. For turf shoulders, the maximum cross slope is 1% per foot and for paved shoulders, greater than 2', the slope will vary from ¼% to ½% per foot.
- c) In Superelevated areas, the median slope may be steepened to a maximum slope of 5:1 to obtain a ditch grade that will drain.
- d) In areas where fill is necessary, the outside shoulders are as shown on Typical Sections. When guardrail is required, the fill shoulder will be widened 3' beyond the face of the guardrail. (See detail Typical Section, 1-2A, Figure 1A).
- e) Positive Drainage Treatment is required when the ditch is less than 18" below the subgrade at the edge of the nearest traffic lane. The Positive Drainage Treatment should be obtained from the Pavement Management Unit. This treatment must be a median underdrain or a minimum roadway grade of 1% in satisfactory drainage soils, or 1.5% in soils, which do not have satisfactory drainage properties. If marginal situations occur, appropriate median drainage structures should be placed to provide adequate ditch drainage.
- f) When proposing a 70' median and two additional lanes (lanes five and six) are imminent in the foreseeable future, the grade point should be placed at the "future" median edge of pavement. (See detail on Typical Section, 1-2B, Figure 4). This cross slope should be 0.02% per foot to the outside. If additional lanes (lanes seven and eight) are added, the slope of the lanes should be toward the median. The median shoulder will have a 1% per foot slope when a turf shoulder is used.

FIGURE 1

1-2B
F - 1**30' - 36' MEDIAN**

USE WHEN WIDENING EXISTING TWO LANE - TWO WAY FACILITY TO FOUR LANES WITH VERY RESTRICTED RW AND THE MINIMUM 46' MEDIAN CANNOT BE PROVIDED.
 **** REQUIRES POSITIVE DRAINAGE TREATMENT TO ADEQUATELY DRAIN THE SUBGRADE. THE DETAIL SHOULD BE OBTAINED FROM THE PAVEMENT DESIGN UNIT.

* USE FINISHED SLOPE $\pm 5'$ FROM ξ OF MEDIAN DITCH IN ORDER THAT DRAINAGE STRUCTURES CAN BE CONSTRUCTED AT THE FINAL ELEVATION ON GRADING PROJECTS.

** SLOPES MAY BE VARIED DURING DESIGN TO 6:1 MINIMUM.

*** SEE ROADWAY DESIGN MANUAL PART 1, CHAPTER 1-48, F-1.

SEE ROADWAY DESIGN MANUAL PART 1, CHAPTER 1-40.

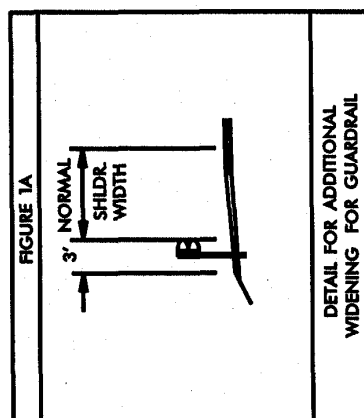
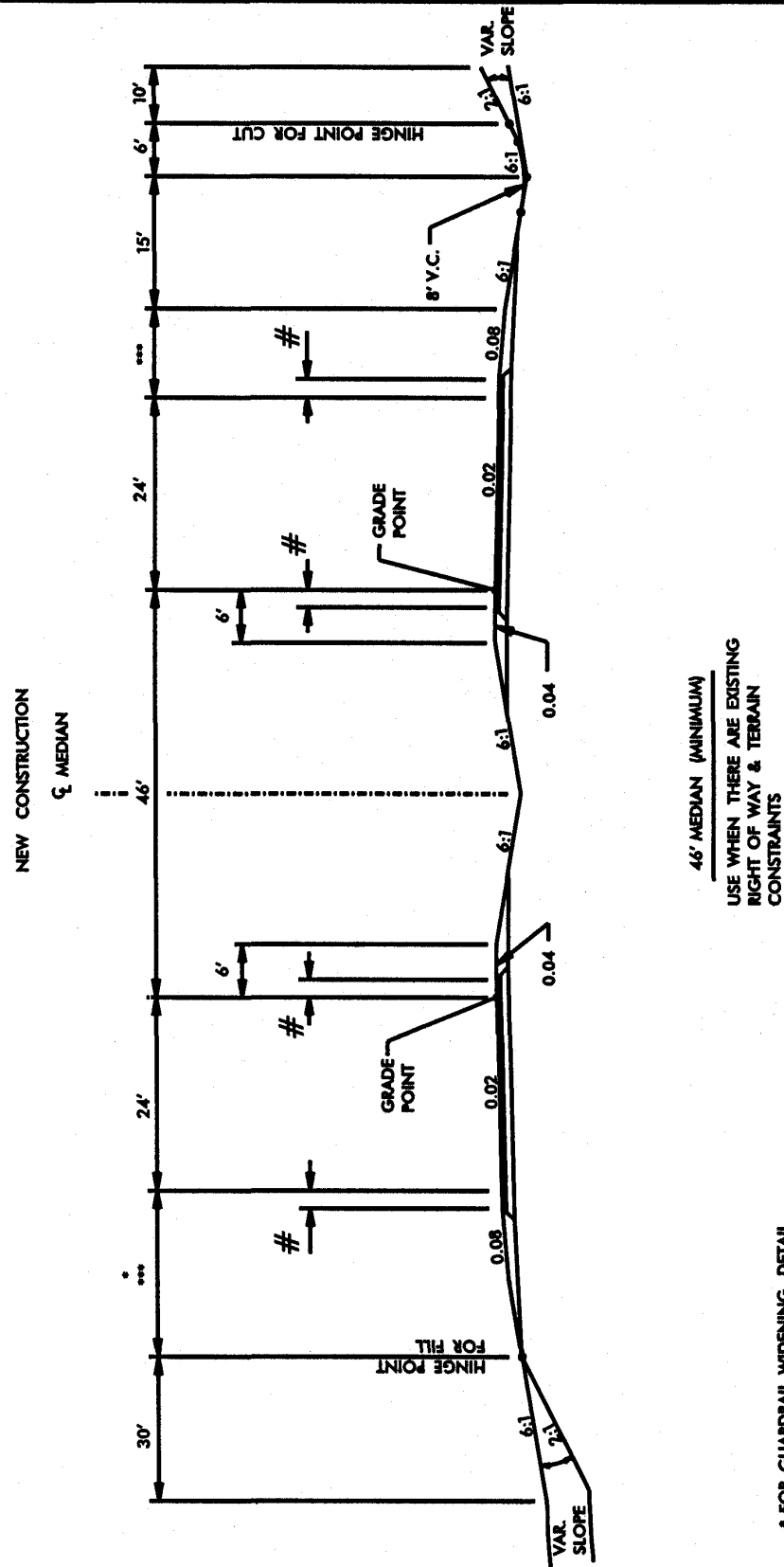
30' - 36' MEDIAN

FIGURE 2A

1-2B

FIG. 2A



* FOR GUARDRAIL WIDENING DETAIL,
SEE FIGURE 1A.

*** SEE ROADWAY DESIGN MANUAL PART 1, CHAPTER 1-4B, F-1.

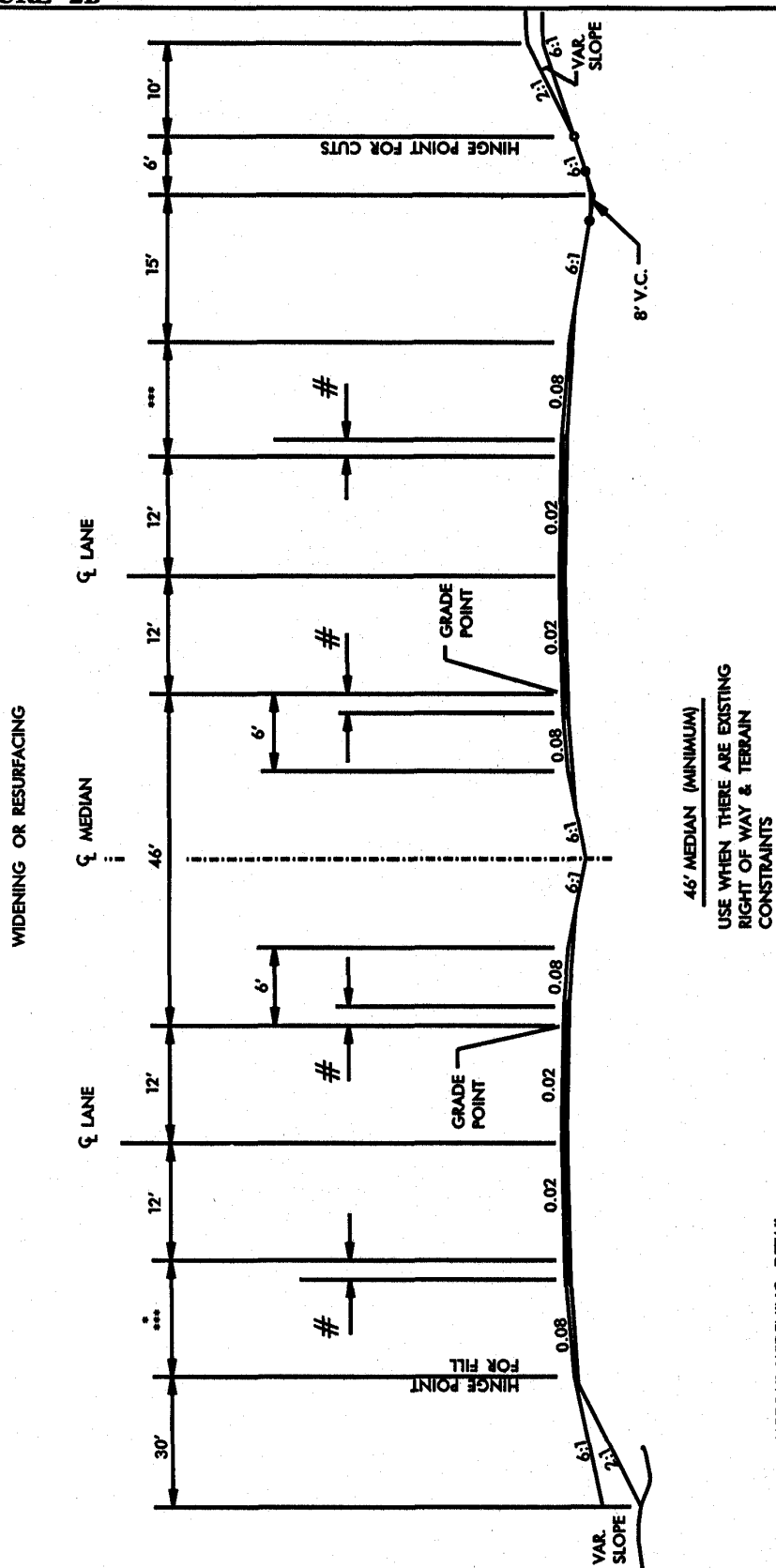
SEE ROADWAY DESIGN MANUAL PART 1, CHAPTER 1-4O.

46' MEDIAN (MINIMUM)

FIGURE 2B

1-2B

FIG. 2B



• FOR GUARDRAIL WIDENING DETAIL, SEE FIGURE 1A.

*** SEE ROADWAY DESIGN MANUAL PART 1, CHAPTER 1-4B, F-1.

SEE ROADWAY DESIGN MANUAL PART 1, CHAPTER 1-40.

46' MEDIAN (MINIMUM)

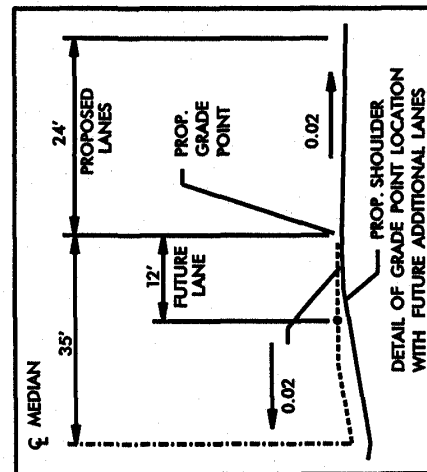
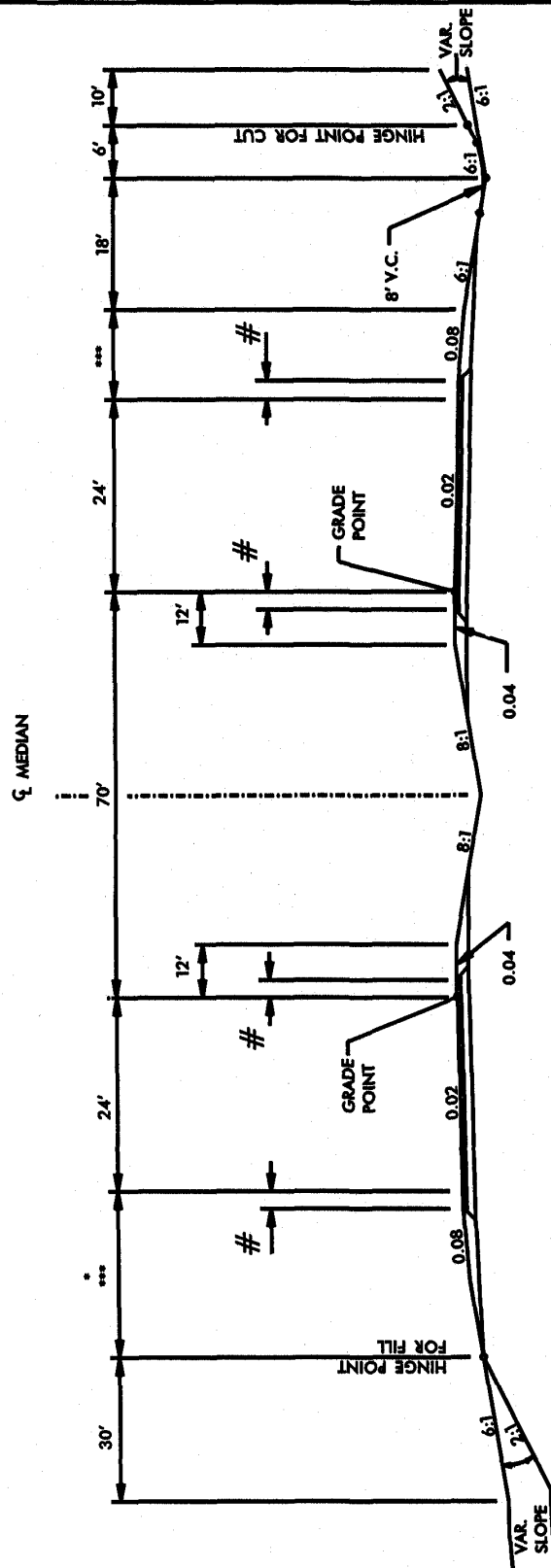
**USE WHEN THERE ARE EXISTING
RIGHT OF WAY & TERRAIN
CONSTRAINTS**

46' MEDIAN (MINIMUM)

FIGURE 4

1-2B

FIG. 4



70' MEDIAN (DESIRABLE)

USE THIS MEDIAN WIDTH FOR FACILITIES ON NEW LOCATION AND ALL OTHER LOCATIONS WHERE PROJECTED TRAFFIC VOLUMES INDICATE ADDITIONAL LANES MAY BE REQUIRED IN THE FORESEEABLE FUTURE.

* FOR GUARDRAIL WIDENING DETAIL, SEE FIGURE 1A.

*** SEE ROADWAY DESIGN MANUAL PART 1, CHAPTER 1-4B, F-1.

SEE ROADWAY DESIGN MANUAL PART 1, CHAPTER 1-4C.

70' MEDIAN (DESIRABLE)